

wherein the surface insulating film is [formed relatively] sufficiently thin to be broken down for forming an electric fuse.

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6. (Amended) The semiconductor device according to claim 4, wherein a plurality of trenches are formed adjacently, and a surface insulating film and a conductive film are formed in each trench.

Please cancel claim 5.

#### REMARKS

Claims 1 through 4 6 and 7 are pending in this application. In response to the Office Action dated December 19, 2001, an editorial change has been implemented in the specification, claim 5 cancelled and claims 1 through 4 and 6 amended. Care has been exercised to avoid the introduction of new matter. Indeed, adequate descriptive support for the present Amendment should be apparent throughout the originally filed disclosure, as, for example, page 1 of the written description of the specification, line 16 through page 5 line 12 and page 9 of the written description of the specification, lines 10 et seq. Applicants submit that the present Amendment does not generate any new matter issue.

A clean copy of the paragraph in the specification affected by the present Amendment and of amended claims 1 through 4 and 6 appear in the Appendix hereto.

**Claims 1, 4 and 5 were rejected under the second paragraph of 35 U.S.C.**

**§112.**

In the statement of the rejection, the Examiner asserted that the term "relatively" renders the claim invention indefinite. This rejection is traversed.

Firstly, Applicants do not agree that the relative expression would have rendered the claimed invention indefinite. Specifically, one having ordinary skill in the art would have understood that the film to be broken down must be capable of functioning as a fuse.

At any rate, in order to expedite prosecution, the claims have been extensively revised and the use of relative expressions avoided. Certainly, claims are not rendered indefinite by merely imploring functional language. See, for example; *In re Oelrich*, 579 F.2d 86, 198 USPQ 210 (CCPA 1978); *In re Spiller*, 500 F.2d 1170, 182 USPQ 614 (CCPA 1974). It should be apparent that one having ordinary skill in the art would have no difficulty understanding the scope of the claimed invention, particularly when reasonable interpreted in light of and consistent with the written description of the specification. *Miles Laboratories, Inc. v. Shandon, Inc.*, 997 F.2d 870, 27 USPQ2d 1123 (Fed. Cir. 1993). Applicants, therefore, submit that the imposed rejections of claims 1, 4 and 5 under the second paragraph of 35 U.S.C. §112 is not legally viable and, hence, solicit withdrawal thereof.

**Claims 3 and 5 were rejected under 35 U.S.C. §102 for lack of novelty as evidenced by Hause et al.**

This rejection is traversed. Indeed, this rejection has been rendered moot by canceling claim 5 and placing claim 3 dependent upon claim 1.

Applicants, therefore, submit that the imposed rejection of claims 3 and 5 under 35 U.S.C. §102 for lack of novelty as evidenced by Hause et al. is not factually viable and, hence, solicit withdrawal thereof.

**Claim 4 was rejected under 35 U.S.C. §103 for obviousness predicated upon Hause et al.**

This rejection is traversed.

Specifically, the semiconductor device defined in claim 4 comprises, inter alia, a surface insulating film and conductive film formed on interior surfaces of a trench. An area in which the surface insulating film and the conductive film are formed occupies a small area on the primary surface of the semiconductor device. However, the area in which the surface insulating film faces the semiconductor substrate is large.

It is not apparent wherein Hause et al. disclose or remotely suggest a semiconductor device as defined in claim 4. Applicants, therefore, submit that the imposed rejection of claim 4 under 35 U.S.C. §103 for obviousness predicated upon Hause et al. is not factually or legally viable and, hence, solicit withdrawal thereof.

**Claims 6 and 7 were rejected under 35 U.S.C. §103 for obviousness predicated upon Hause et al. in view of Perng et al.**

This rejection is traversed.

Claims 6 and 7 depend from independent claim 4. Applicants incorporate herein the arguments previously advanced in traversing the imposed rejection of claim 4 under 35 U.S.C. §103 for obviousness predicated upon Hause et al. The additional reference to Perng et al. does not cure the argued deficiency of Hause et al.

Applicants, therefore, submit that the imposed rejection of claims 6 and 7 under 35 U.S.C. §103 for obviousness predicated upon Hause et al. in view of Perng et al. is not factually or legally viable and, hence, solicit withdrawal thereof.

**Claims 1 and 2 were rejected under 35 U.S.C. §103 for obviousness predicated upon Nguyen in view of An et al.**

In the statement of the rejection, the Examiner concluded that one having ordinary skill in the art would have been motivated to modify the semiconductor device disclosed by Nguyen by providing a puerility of isolation regions in view of An et al. This rejection is traversed.

There are significant structural differences between the claimed semiconductor device and the devices disclosed by Nguyen and An et al. that undermine the obviousness conclusion. Specifically, the semiconductor device defined in claim 1 comprises a first portion with a plurality of active regions separated by isolation regions.

In addition, the claimed semiconductor device comprises a second portion containing at least one trench with an interior surface. A surface insulating film is formed on the surface of the active regions in the first portion and also lines the trench in the second portion. Significantly, the insulating film is formed at a thickness which is sufficiently

thin so that it is capable of functioning as an electric fuse, a concept is neither disclosed nor suggested by either of the applied references.

Based upon the foregoing, it should be apparent that even if the applied references are combined, the claimed invention would **not** result. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 USPQ2d 1434 (Fed. Cir. 1988).

Applicants separately argue the patentability of **claim 2**, which specifies that a plurality of insulating films are formed, and one of the insulating films is the insulating film that is also formed in the trench in the second portion and is at a thickness capable of functioning as an electric fuse.

Applicants would point out that the purposeful design of the insulating film at a thickness sufficient to function as an electric fuse is functionally significant in enabling increase miniaturization. That one having ordinary skill in the art would have understood that capacitor dielectrics and gate electrodes are not designed to be intentionally blown.

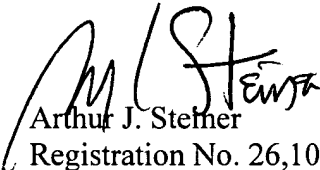
Based upon the foregoing, it should be apparent that one having ordinary skill in the art would not have found the claimed invention as a whole obvious within the meaning of 35 U.S.C. §103 based upon the applied prior art. Applicants, therefore, submit that the imposed rejection of claims 1 and 2 under 35 U.S.C. §103 for obviousness predicated upon Nguyen in view of An et al. is not factually or legally viable and, hence, solicit withdrawal.

Based upon the foregoing, it should be apparent that the imposed rejections have been overcome and that this application is in clear condition for immediate allowance. Favorable consideration is, therefore, respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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## APPENDIX

## IN THE SPECIFICATION:

The paragraph bridging page 2 and 3 now reads as follows:

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In another aspect, the semiconductor device comprises a plurality of surface insulating films formed on a surface of the active region of the semiconductor substrate, and the surface insulating films are formed at different thicknesses. A plurality of conductive films are formed on each of the surface insulating films. Then, one of the surface insulating films having smaller thickness is caused to break down and to work as an electric fuse.

## IN THE CLAIMS:

Claims 1 through 4 and 6 now read as follows:

- Sub C1
1. (Amended) A semiconductor device comprising:
- a semiconductor substrate;
  - a first portion comprising a plurality of active regions formed in the semiconductor substrate;
  - a plurality of isolation regions separating the active regions from each other;
  - a second section comprising at least one trench having an interior surface;
  - a surface insulating film formed on a surface of the active regions in the first portion and on the interior surface of said at least one trench in the second portion; and
  - a conductive film formed on the surface insulating film, wherein the surface insulating film is sufficiently thin to function as an electric fuse.
- A2

2. (Amended) The semiconductor device according to claim 1, further comprising:

a plurality of surface insulating films, having different thicknesses, formed on a surface of the active regions in the first portion and on the interior surface of said at least one trench in the second portion; and

a plurality of conductive films formed on each of the surface insulating films in the first portion;

wherein one of the surface insulating films has a smaller thickness than the other insulating films and is the insulating film which is formed on the interior surface of said at least one trench in the second portion and is capable of functioning as an electric fuse.

3. (Amended) The semiconductor device according to claim 1, wherein:  
the plurality of insulating films are gate oxide films; and  
the plurality of conductive films are gate electrodes.

4. (Amended) A semiconductor device comprising:

a semiconductor substrate;

at least a trench formed in the semiconductor substrate;

a surface insulating film formed along a surface of the trench of the semiconductor substrate; and

a conductive film formed on the surface insulating film;



*Amended* wherein the surface insulating film is sufficiently thin to be broken down for forming an electric fuse.

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*Amended* 6. (Amended) The semiconductor device according to claim 4, wherein a plurality of trenches are formed adjacently, and a surface insulating film and a conductive film are formed in each trench.

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